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THE IMPLEMENTATION OF CONTEXTUAL MINI LABORATORY APPROACH TO IMPROVE THE MATHEMATICAL UNDERSTANDING OF STUDENTS IN MARGINAL SCHOOL PALM PLANTATION AREA KOTO GASIB SUBDISTRIC, SIAK REGENCY

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Abstract

This study based of the facts that showed the mathematics learning in marginal schools were still poor quality. Based on that facts, in order to distribute the attendance of suitable and quality education evenly, than it needs the effort of learning improvement in marginal schools which accord with their characteristics. The aim of this study is to describe the learning effectiveness and the mathematics ability of students through the implementation of mini laboratory approach. The subject of this study is students on grade IV and V Elementary School 012 (marginal classes) Teluk Rimba, Koto Gasib Subdistric, Siak Regency. The result of this study showed that the appliying of learning are efective and mathematics understanding of students on the integer addition were in good category.

Keyword : Mini Laboratory, Mathematical Understanding

A. Introduction

This study based of the real condition which has the poor quality learning in marginal schools. It based of the experience of researcher as the associate teacher marginal elementary school 012 Teluk Rimba, Koto Gasib Subdistric, Siak Regency. The result of observation and interview with their teachers showed many factors as cause the poor quality on learning, there are: (1) the learning management tended to be conventional, so that the empowerment of students on building their knowledge being poor because the teacher taught on the two class at once; (2) The opportunity of students to build their knowledge were optimal yet because the learning facilities were minimum and the reading ability of students were very weak.

Based on the above learning condition, it need the effort of learning process improvement in order to comply the opportunity of getting worthy education that accord with education system. This efforts must observe the characteristics of students and the environment condition in marginal school in order to build the meaningful learning. Despitefully, considering the reading ability of students in marginal class were very weak, than the use of aid tools is appropriate. One of learning approach in line with that paradigm is the mini laboratory approach (mini-lab).

The use of mini-lab terminology is based on the simplicity of using tools and the activity of mini-lab is performed in class. This mini-lab activity is different with the use of the general aid tools. The main function of both of this approach is same to emphasize the concepts, but the realization technique is different. On the mini-lab activity, the aids is focused to the students, than they can do it directly to manipulate the studied concept and principle and making conclusion, while the teacher is as a facilitator.

Meanwhile, the known learning by aid tools approach until now is that the activity is focused by teacher, than teacher manipulates directly the studied concept and principle and the students just observed the explaining of teacher. Therefore, the students do not manipulate the

studied concept or principle.

Related to the mini-lab approach, Glencoe (1998:1) stated that the laboratory is designed to improve the participation of active students. The activities of students in laboratory are: (1) trying hypothesis; (2) applying the available data; (3) discovering the new information (knowledge); (4) summarizing based the result of observation.

Collins et al (1995:8) stated that the mathematics laboratory and mini laboratory give the opportunity for students to investigate and discover on working cooperation or autodidact. Daniel Lucy et al (1995:51) stated that mini laboratory activities involve the student in learning by using the scientific method, so it can be used to train the ability of critical thinking.

Then Daniel Lucy in life science (1995;5T-14T) stated that the benefit of mini laboratory are:

1. Using minimum equipment, student can do laboratory activities
2. Facilitated the students inunderstanding thelearning materials, becausestudents are exposedto thedirect object.
3. It can guide the students to discover themselves.
4. Train the students to think critically.
5. Train the students active in question.
6. Encorage the students to explore new concepts.
7. Providing the opportunity to learn by using scientific method.

Slavin (1994:310) stated that effectiveness of learning is determined by indicator (1) Quality of Intruction; (2) Approprite Levels of Intruction; (3) Incentive; (4) time. Then Eggen et all (1996:1) stated that effectiveness of learning can happen if the students involve to organized the relation of the information provided. Students not only receive knowledge passively transferred teacher.The results of this activity not only improves understanding and retention of the learning materials. But also to improve thinking ability. In other literature, Reigeluth and Merrill (in Degeng,1989:165) stated that the effectiveness measurement should always conected the achievement of learning objectives. Taking into account the advice of the above it can be concluded that the effectiveness of learning associated with higher levels of teacher activity , student activity in learning , and the achievement of learning outcomes by students.

Understanding of the term is found in various writings. Sumarmo (1987:22) translates the concept of understanding. Ansari (2003: 33) uses the word as a translation of the term understanding of knowledge . Ruseffendi (2006:220) uses the term as a translation of understanding. According to Van Hille (1986) mathematical understanding is a process that consists of the previous regime , the concepts of network relations between these concepts include multiple representations of the five stages of thinking individuals , namely the creation , analysis, sequencing , deductive and accuracy . On the basis of these opinions can be said bahawa mathematical understanding is the ability to recognize the objects of mathematics and mathematical thinking in solving mathematical problems or use.

B. Research Methodology

This research is a experimental research design with the " One - Gruop Pree and post-test design " is described : O X O , O : beginning and end of the test , X : Treatment (Tuckman, 1978). The subjects were students of class IV and V Elementary School 012Teluk Rimba, KotoGasib district , Siak Regency, Riau . The data were collected by the observation and testing techniques and analyzed by means of descriptive analysis. Referring to the limits of the effectiveness of learning mentioned earlier, the indicator of the effectiveness of learning in this study are based on the following aspects:(1) achieving KKM or equal to 70% of the number of students; (2). activities of students and teachers in the educational well categorized .

Moreover, the activity of the teacher and student views of the frequency behavior of teachers and students in a given time interval , so that it can be interpreted with the ideal percentage of time specified in the RPP . In accordance with the division of time in the RPP and the tolerance of 5% , then the criteria for the ideal limit the effectiveness of the activities of students and teachers are set as follows :

Table.1 Citeria of Student Activeness

Aspects Ofobserved	Limit	**Category of Effectiveness**		
		Great	**Good**	**Bad**
Reading and Writing (AS-1)	10 % ≤ PWA ≤ 20 %	If all aspects is fulfilled	IfAS-2, AS-3, andone of them fulfilled	If all aspects is not fulfilled
Using the Media (AS-2)	35 % ≤ PWA ≤ 45%			
Discussion and Asking(AS-3)	35 % ≤ PWA ≤ 45 %			
behavior (AS-4)	0 % ≤ PWA ≤ 10 %			

Table.2 Criteria Of Teacher Activeness

Aspects Ofobserved	Limit	**Kategori Efektivitas**		
		Great	**Good**	**Bad**
Opening (AG-1)	5 % ≤ PWA ≤ 15 %	If all Aspects is fulfilled	If aspects 3,4 and one of them fulfilled	If all aspects is not fulfilled
Observed the working of Students (AG-2)	45 % ≤ PWA ≤ 55 %			
Discussing the student working (AG-3)	30 % ≤ PWA ≤ 40 %			
Behavior is not relevant (AG-4)	0 % ≤ PWA ≤ 10 %			

Note : PWA is percentage of time activity

Then , from this criteria, we can organize the matric of Learning effectiveness ..

Tabel. 3 Matrics Of Learning Effectiveness

Indicator	*Indicator*	*Effective*
AchieveKKM Teacher activities Students activies	≥ 70% siswa mencapai KKM minimum good categori minimum good categori	If all aspects is fulfilled

C. Results and Discussion

C.1 Learning Effectiveness

Referring to effective learning indicators are defined , will be detailed picture of the activities of the students and the role of teachers in teaching and learning, and student achievement by KKM respectively. The analysis of student activity recap obtained the average appearance of students in learning activities as listed in Table 4.

Table.4 The Recapitulation Of The Average Appearance Students Activities

Aspect	**Persentage of appreance students activities**			**Average**
	Pert-1	**Pert-2**	**Pert-3**	
AS-1	24,2	22,8	18,3	21,8
AS-2	34,1	37,1	35,2	35,4
AS-3	30,1	36,4	39,2	35,2
AS-4	11,6	6,5	6,3	8,1

Based on the data in Table 4 , obtained by 21.8 % of the total time students learn to read and write to the study in question , 35.4 % of the working discuss with props or requests to 35.2 % and 8 1 % of students outside the learning activity . With reference to the criteria in Table 2 then categorized both aspects of student activity .

The results of the above analyzes student activity indicates that the application of the mini laboratory approach learning climate that provides opportunities for students to construct knowledge can create more meaningful . While learning of students in general are in line with the vision of constructivist learning theory , but a large part of the activity of writing and reading (21.8%) indicated that student effort in building knowledge is not optimal.

Recognized that the reading ability is important and it is one of the weaknesses of the marginal students to improve learning , it should use the language as simple as possible . In connection with the media or props and worksheet more focused on the using of images and symbols of mathematics . In addition , in an attempt to optimize of work to using props and discussion , it is necessary to provide sufficient and variation media so that the students can train optimally.

The analysis results obtained by averaging the emergence of teacher activity every teacher in the learning activities as listed in Table 5.

Table. 5 The Recapitulation Of The Average Appearance Teachers Activities

Aspect	**Persentage Of Appreance Teachers Activities**			**Average**
	Pert-1	**Pert-2**	**Pert-3**	
AG-1	11,8	13,6	12,8	12,7
AG-2	42,9	49,1	46,8	46,3
AG-3	39,9	33,2	34,5	32,2
AG-4	6,7	5,9	8,4	6,8

Based on the obtained Tabel.5 the fact that 12.7 % of the total instructional time teachers use to open the lesson , 46.3 % of the students observe and immediately complete the task , 32.2 % to discussing work of students , and 6.8 % . behavior is not relevant. With reference to the criteria in Tabel.3 then categorized either aspect of teacher activity .

Look at the activities of teachers in directing and facilitating student learning is basically good enough , considering 78.5 % of the total learning time is used to observe students and engage in learning and reflect the work of students . This indicates that the teacher in the learning activities are in line with the view of constructivism in education.

But the time students spend on aspects of the use of props and discussed by 70.6 % and direct the activities of teachers and facilitate student learning of 78.5 % suggests that the role of the teacher as facilitator not capable to optimize the knowledge can be built . the activity of the students. It means, there is a possibility or suspicion that the activity of the teacher as facilitator observed dominant than directing students in completing their tasks . By taking the features of marginal students and teachers in the learning mode should all teachers in guiding students more dominant than the other activities . In thiscontext, it can argued that the activities of teacher and student in the learning is not syncronic.

Then, Based on the learning result analysis of students is obtained data about the achievement of Material Completeness Criteriaby students on Table 5

Table. 5 Material Completeness Criteriaby Students

Subject Code	Score	The Achievement Ofmaterial Completeness Criteria
SIV-1	62,5	TT
SIV-2	75	T
SIV-3	75	T
SIV-4	75	T
SIV-5	37,5	TT
SIV-6	75	T
SIV-7	75	T
SIV-8	75	T
SIV-9	75	T
SIV-10	75	T
SIV-11	50	TT
SIV-12	75	T
SV1	75	T
SV2	75	T
SV3	62,5	TT
SV4	75	T
SV5	75	T
SV6	75	T
SV7	87,5	T

KKM = 64

Based on the table 6, the number of students who achieve KKM is 73,6%. Therefore, the aspect of learning result based the effectiveness indicator comply the defined criteria. Considering the above analysis result and the defined learning effectiveness, than the teacher had been managed the learning with effective category.

Although the achievement oflearning result complied the criteria of learning effectivenss, but the learning result of students were not optimal yet, because the average was 69,7 with good category. It showed that it need the efforts of better learning improvement. That improvement must head to the activity of students to build their knowledge through observation and visual aids. In the other hand, the mathematical understanding level of students when they worked by using visual aids (concrete), before moving to use the semi-abstact media.

C.2. The Mathematical Understanding

Based on the analysis result of mathematical understanding students about the integer addition, it is obtained the total and presentasi facts of students on each indicator, showed on Table 6.

Table 6. The Recapitulation Of Mathematical Understanding Students.

Subject	The Indicator of mathematical understanding							
	13 + 7	13 + -7	-13 + 7	-13 + -7	7 + 13	7 + (-13)	-7 + 13	-7 + -13
Total	19	13	10	16	19	6	5	19
%	100	68	53	84	100	32	32	100

Based on the above table, the mathematical understanding of students about the integer addition was not optimal yet, such as on the indicator: (1) 7 + (-13), (2). -7 + 13, (3) -13 + 7, and (4) 13 + -7. The dominan mistake of students on integer addition is determining the addition of negative and positive integer. Then, the mistake frekuensi of addition integers which the front smaller number is more than the front bigger number.

Connection with that facts, than to decide the solution, it need to be investigated. As the beginning step, the alternative answer of students is on this below Table.7:

Table 7. The Recapitulation Of The Number Students Percentage On False Answer Alternative.

	The alternative answer			
Indicator	Answer	%	Answer	%
7 + (-13)	6	9	-20	4
-7 + 13	-6	11	-20	3
-13 + 7,	-20	2	6	7
13 + -7	-6	4	-20	2

Based on above the alternative answer, the researcher did the clarification of that answers with students to get their thinking process on determining the addition result. The result of interview are:

1. For the indicator: 7 + (-13) = 6 and -7 + 13 = -7, their thinking process is the mark of addition result, following the smaller number.
2. For the indicator: 7 + (-13) = -20 and -7 + 13 = -20, -13 + 7 = -20 and 13 + -7 = -20, their thinking process is the number addition, then given the negative mark because one of them is negative integer.
3. For the indicator: -13 + 7 = 6, their thinking process is -13 + 7 = 13 – 7, then the answer is 6
4. For the indicator: 13 + -7 = -6, their thinking process is 13 + -7 = - (13 –7)

Considering the representations of students on determining that addition result, than it can be presumed that the causes of mistake are:

1. Representation of students on indicator: 7 + (-13) = 6 and -7 + 13 = -7, which their thinking process is the number addition, then given the negative mark because one of them is negative integer and on the indicator: : 7 + (-13) = -20 and -7 + 13 = -20, -13 + 7 = -20 and 13 + -7 = -20, their thinking process is the number addition, then given the negative mark because one

of them is negative integer showed that the students do not have mathematical understanding. Their representations tend to their assumptions, not showing the mathematical mistakes like the mistake of algorithm use or addition principle. (Mistake type-1)

2. Representation of students on indicator: -13 + 7 = 13 - 7 = 6 and on the indicator: 13 + -7 = -(13 – 7) = -6 showed that the students had the wrong mathematical understanding (Mistake type-2)

Based on mistake type-1 which is caused that the students do not have mathematics understanding about the addition of positive and negative integer. According to researcher the improvement of learning are:

1. For the first step, the teachers imply the activity approach to manipulate the addition of positive and negative integers by visual aids or picture.
2. For the second step, the teachers imply the concept of zero (0) on addition by using worksheet, for example:

$$\begin{aligned} -7 + 13 &= \\ -7 + 7 + 6 &= \\ 0 + 6 &= 6 \end{aligned}$$

Then, to the mistake type-2, the learning improvement is by explaining the difference mark of negative integer and the mark of subtraction. Despitefully, students must be given the remedial learning by the approach of concept integer 0.

D. Conclusion

1. The Implementation of mini laboratory approach is effective to improve the learning quality and mathematics ability of students grade IV and V Marginal Elementary School 012 Teluk Rimba, Koto Gasib Subdistric, Siak Regency
2. The activity of teacher and students is on the good category during learning, but it is not optimal yet on building the knowledge of students
3. The Implementation of mini laboratory approach does not optimize yet the learning result and the mathematics ability of students, as the impact of not optimal the empowerment of students on building their knowledge

E. Suggestion

1. One of factors which caused the empowerment of students on building their knowledge in this study is not optimal yet is the constraint of provided media. Then, it is suggested on the approach of mini laboratory, especially for marginal school, each pair of students get the media.
2. Considering the mathematics ability and reading ability of marginal school student is poor, then the media must be settled to be variation media in order to help students on getting the optimal learning experiences, so that their mathematics ability would be better.

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